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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,796	10/17/2003	Marcus H. Pendergrass	(Opt.) ALER1240	9735

44654 7590 02/04/2008

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EXAMINER	
SAMUEL, DEWANDA A	
ART UNIT	**PAPER NUMBER**
2616	

MAIL DATE	DELIVERY MODE
02/04/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 10/688,796	Applicant(s) PENDERGRASS ET AL.	
	Examiner DeWanda Samuel	Art Unit 2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 November 2007.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-8,10-32,34-44,46-56,58-72,74-80,82-91,93-108 and 110-113 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-8,10-32,34-44,46-56,58-72,74-80,82-91,93-108 and 110-113 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 17 October 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Claims 9,33,45,57,73,81,92,109 has been cancelled and **claims 1,13,24,28,29,34,41,46,53,65,70,72,74-76,77-80,82-91,93-99, and 104** have been amended

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 13-23 are rejected, it claims " a set of poiconets", The claimed subject matter is nonstatutory functional descriptive material as stated in the MPEP 2106 Patentable Subject Matter. It is suggested that the applicant rewrite claims terms of" a computer readable medium, stored with, embodied with or encoded with a computer program or computer executable instructions."

Claims 24-28 are rejected, it claims " a set of poiconets", The claimed subject matter is nonstatutory functional descriptive material as stated in the MPEP 2106 Patentable Subject Matter. It is suggested that the applicant rewrite claims terms of" a computer readable medium, stored with, embodied with or encoded with a computer program or computer executable instructions."

Claims 65-98 are rejected, it claims " computer readable medium storing computer executable instructions executable", The claimed subject matter is nonstatutory functional descriptive material as stated in the MPEP 2106 Patentable Subject Matter. It is suggested that the applicant rewrite claims 65, 77, and 88 in terms of" computer readable storage medium for storing computer executable instructions executable"

Claims 99-103 are rejected, it claims " a poiconet ", The claimed subject matter is nonstatutory functional descriptive material as stated in the MPEP 2106 Patentable Subject Matter. It is suggested that the applicant rewrite claims terms of" a computer readable medium, stored with, embodied with or encoded with a computer program or computer executable instructions."

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims 1-8, 10-13,20-23, 65, 71,72,74,75 and 76** are rejected under 35 U.S.C. 103(a) as being unpatentable over Souissi et al. (US Patent 6,920,171) in view of Panaski et al. (EP 1119112) and Kostick et al. (US Patent 6,549,784).

With regard to claim 1, Souissi et al. discloses having a *method of establishing a set of piconets;* Souissi et al. discloses having an synchronize frequency hopping communications on an associated discrete localized networks or "piconets" 19,20,21 including a master and a number of "slaves" devices 27 in fig. 1 (column 8 line 30-36). *comprising: generating a set of codes, wherein each code corresponds to a sequence of dwell times and bands, wherein the sequence includes at least one group of dwell times;* Souissi et al. discloses having a time-slot- and-frequency combination in fig. 3 and 4 whereby forming codes. Souissi et al. further discloses that master 25 comprises defining a sequence of time division multiple access time slots for the respective piconet 20 (column 8 line 66-67 and column 9 line 1)...and defining the frequency hopping sequence to used by all the devices communicating on that piconet 20 (column 9 line 1-3).

and assigning codes to the piconets in the set of piconets, Souissi et al. discloses having different frequency hopping schemes (e.g. time slot and frequency, "codes") for tow or more piconets 19, 20, 21 (column 14 line 4-6).

wherein: each piconet in the set of piconets has a unique code compared to the other piconets in the set of piconets, wherein the unique code is a member of the set of codes; Souissi et al. discloses having a piconets 19,20, and 21 in fig. 1... frequency hopping schemes (e.g. time slot and frequency,) which includes 130,000 choices of time-slot-and-frequency combinations ("unique codes", column 4 line 59-67). It is inferred that the frequency hopping schemes (e.g. time slot and frequency, "codes") are unique thereby not causing a collision during transmission of data.
and during a time span, any two different piconets in the set of piconets are capable of using one or more same bands for a collective time for each group of dwell times, no longer than the longest dwell time within such group of dwell times; Souissi et al. discloses two independent piconets will sometimes choose the same frequency channel during at least part of the same time slot (column 5 line 31-33). However, Souissi et al. does not disclose no longer than the longest dwell time within such group of dwell times. Panaski et al. discloses having a a master-slave dwelling technique in which the master and slave a transmitting on the on the same frequency within the same dwell time (fig. 2B and page 6 paragraph 30 line 1-8-10).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a time slot as taught by Souissi et al. with a

master and slave dwelling technique as taught by Panaski et al. to provide a technique that will increase performance gains and extend the range of operation.

<u>substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band.</u> Souissi et al. discloses having a wireless network utilizing a ISM band ...the overall communication load is spread over a wide frequency band by causing communicating devices to transmit on a given channel in the band and then hop to a different channel (column 4 line 5056). However, Souissi et al. does not explicitly disclose substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band. Kostic et al. discloses having a method and apparatus for implementing measurement based dynamic frequency hopping in wireless communication systems (title)...it also reduces interference in a frequency hopping wireless communication (abstract). Kostic et al. further discloses having a quality measurement module 424 then analyzes each frequency hop pattern using the rank information to identify terminal frequency hop patterns in which one or more frequencies should be replaced with system frequencies having higher quality values (lower interference levels)... frequency hop pattern adaptation module 426 determines which frequencies should be replaced (column 9 line 35-50). It is inferred the replaced frequencies can come from different frequencies band with the frequency spectrum.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a wireless network utilizing a ISM band whereby the overall communication load is spread over a wide frequency band as taught by Souissi et al. replacing frequencies according to their interference level as taught by Kostic et al. increasing the efficiency of a wireless communication system by avoiding using frequencies with high interference levels.

With regard to claim 8, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the method in claim 1. *further comprising changing a state of a band within at least one of the codes for at least one piconet from a first state to a second state, wherein: the first state is a designated state or an undesignated state; and the second state is the other of the designated state or the undesignated state.* Souissi et al. discloses having piconets 19,20, and 21 utilizing frequency jumps with time-slot-and-frequency combinations ("bands" column 4 line 59-65). Watanabeet al. discloses having a wireless communication of a spread spectrum communication system 11 that performs frequency hopping using a plurality of frequency channels having different frequencies and defined in a usable frequency band (Abstract). Watanabe et al. further discloses have a channel select process whereby is determined which communication channel is excluded from the frequency hopping sequence (column 7 paragraph 28 line 1-14).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a frequency jumps as taught by Souissi et al.

excluding communication channels from the frequency hopping sequence as taught by Watanabe et al. to avoid channels that are not degraded by interference.

With regard to claim 10, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the method in claim 1. *wherein each of the bands has a frequency range of at least 400 MHz.* Souissi et al. discloses the network may employ packet switching, wherin the time slots are defined by the frequency hopping intervals (in Bluetooth, 1600 hops per second in through an arbitrary order of sequential 1 Mhz channels 2.402 and 2.480 GHz, column 134 line 55-60). It is inferred that the frequency channels can be increased to allow transmission of more data It is inferred that the frequency channels can be increased to allow transmission of more data. It is inferred the frequency sequence can range from 400 MHz.

Souissi et al. teaches the claimed invention except for the 400 MHz. It would have been obvious to one having ordinary skill in the art at the time the invention was made set the minimum frequency range since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

With regard to claim 11, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the method in claim 1. *wherein the set of piconets is designed for a wireless communicating medium.* Souissi et al. discloses having piconets 19, 20, and

21... also any of the communication devices can be become an access point or node through which devices communicate (column 3 line 56-67).

With regard to claim 12, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the method in claim 1. *further comprising adding another piconet to the set of piconets, wherein the another piconet has a unique code compared to previously existing piconets within the set of piconets.* Souissi et al. discloses a given network ("piconet") can have one AP (access point) 48 or can have more than one , which are capable of joining or maintaining different piconets, which have different frequency hopping sequence ("unique code", column 17 line 65-67 and column 18 line 1-14). It is inferred that the network ("piconet") joining another piconet will have the own unique frequency hopping sequence.

With regard to claim 13, Souissi et al. discloses having a *set of piconets comprising piconets,* Souissi et al. discloses having a piconets 19,20, and 21 in fig. 1. *wherein: each piconet in the set of piconets has a unique code compared to the other piconets in the set of piconets, wherein the each unique code corresponds to a sequence of dwell times and bands,* Souissi et al. discloses having a time-slot- and-frequency combination in fig. 3 and 4 whereby forming codes. Souissi et al. further discloses that master 25 comprises defining a sequence of time division multiple access time slots for the respective piconet 20 (column 8 line 66-67 and column 9 line 1)... and

defining the frequency hopping sequence to used by all the devices communicating on that piconet 20 (column 9 line 1-3).

wherein the sequence includes at least one group of dwell times; Souissi et al. discloses having piconets 19, 20, and 21...with 130,000 time-slot-and frequency combinations to choose from (column 4 line 59-67). Souissi et al. further discloses in fig. 3 and fig.4 the hopping sequence for each piconet within their own time slot (column 13 line 48-63). It is inferred that each piconet is given a hopping sequence within a different time slot.

and during a time span, any two different piconets in the set of piconets are capable of using one or more same bands for a collective time for each group of dwell times, no longer than the longest dwell time within such group of dwell times, Souissi et al. discloses two independent piconets will sometimes choose the same frequency channel during at least part of the same time slot (column 5 line 31-33). However, Souissi et al. does not disclose no longer than the longest dwell time within such group of dwell times. Panaski et al. discloses having a master-slave dwelling technique in which the master and slave a transmitting on the on the same frequency within the same dwell time (fig. 2B and page 6 paragrph 30 line 1-8-10).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a time slot as taught by Souissi et al. with a

master and slave dwelling technique as taught by Panaski et al. to provide a technique that will increase performance gains and extend the range of operation.

wherein response to interference substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band.

Souissi et al. discloses having a wireless network utilizing a ISM band ...the overall communication load is spread over a wide frequency band by causing communicating devices to transmit on a given channel in the band and then hop to a different channel (column 4 line 5056). However, Souissi et al. does not explicitly disclose substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band. Kostic et al. discloses having a method and apparatus for implementing measurement based dynamic frequency hopping in wireless communication systems (title)...it also reduces interference in a frequency hopping wireless communication (abstract). Kostic et al. further discloses having a quality measurement module 424 then analyzes each frequency hop pattern using the rank information to identify terminal frequency hop patterns in which one or more frequencies should be replaced with system frequencies having higher quality values (lower interference levels)... frequency hop pattern adaptation module 426 determines which frequencies should be replaced (column 9 line 35-50). It is inferred the replaced frequencies can come from different frequencies band with the frequency spectrum.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a wireless network utilizing a ISM band whereby

the overall communication load is spread over a wide frequency band as taught by Souissi et al. replacing frequencies according to their interference level as taught by Kostic et al. increasing the efficiency of a wireless communication system by avoiding using frequencies with high interference levels.

With regard to claim 20, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the set of piconets recited in claim 13. *wherein each of the bands for each piconet is in a first state or a second state, wherein: the first state is a designated state; and the second state is an undesignated state.* Souissi et al. discloses having two or more piconets with time slots that are defined by the frequency hopping intervals...during transmission the piconets channels tend to overlap in time and frequency (column 13 line 44-63)...also in fig. 3 a graphical illustration of the designated states and undesignated states are represented. It is inferred the time and frequency sequence is capable of having a designated state and a udesignated during transmission.

With regard to claim 21, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the set of piconets recited in claim 13.*wherein each of the bands has a frequency range of at least 400 MHz*. Souissi et al. discloses the network may employ packet switching, wherin the time slots are defined by the frequency hopping intervals (in Bluetooth, 1600 hops per second in through an arbitrary order of sequential

1 Mhz channels 2.402 and 2.480 GHz, column 134 line 55-60). It is inferred that the frequency channels can be increased to allow transmission of more data.

Souissi et al. and Panaski et al. discloses the claimed invention except for frequency range of at least 400 MHz. It would have been obvious to one having ordinary skill in the art at the time the invention was made to increase the frequency channel in order to transmit more data since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

With regard to claim 22, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the set of piconets recited in claim 13. *wherein the set of piconets is designed for a wireless communicating medium.* Souissi et al. discloses having piconets 19, 20, and 21... also any of the communication devices can be become an access point or node through which devices communicate (column 3 line 56-67).

With regard to claim 23, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the set of piconets recited in claim 13.*wherein a device, within a first piconet within the set of piconets, is capable of communicating simultaneously over at least two bands within the first piconet.* Souissi et al. discloses having a piconet 19,20, and 21 with devices in communication with one another(column 9 line 58-60)...the Bluetooth protocol rules of access determines the frequencies that can be used and the minimum rate at which the piconets and their devices 22 must change from one

frequency to another. It is inferred that the devices within the piconets have the capability to communicate simultaneously over at least two frequency bands.

With regard to claim 65, Souissi et al. discloses having a *computer readable medium storing computer executable instructions executable for establishing a set of piconets, executable instructions comprising:* Souissi et al. discloses having an synchronize frequency hopping communications on an associated discrete localized networks or "piconets" 19,20,21 including a master and a number of "slaves" devices 27 in fig. 1 (column 8 line 30-36).

an instruction for generating a set of codes, wherein each code corresponds to a sequence of dwell times and bands, wherein the sequence includes at least one group of dwell times; Souissi et al. discloses having a time-slot- and-frequency combination in fig. 3 and 4 whereby forming codes. Souissi et al. further discloses that master 25 comprises defining a sequence of time division multiple access time slots for the respective piconet 20 (column 8 line 66-67 and column 9 line 1)...and defining the frequency hopping sequence to used by all the devices communicating on that piconet 20 (column 9 line 1-3).

and an instruction for assigning codes to the piconets in the set of piconets, Souissi et al. discloses having different frequency hopping schemes (e.g. time slot and

frequency, “codes”) for tow or more piconets 19, 20, 21 (column 14 line 4-6).

wherein: each piconet in the set of piconets has a unique code compared to the other piconets in the set of piconets, wherein the unique code is a member of the set of codes; Souissi et al. discloses having a ppiconets 19,20, and 21 in fig. 1... frequency hopping schemes (e.g. time slot and frequency,) which includes 130,000 choices of time-slot-and-frequency combinations (“unique codes”, column 4 line 59-67). It is inferred that the frequency hopping schemes (e.g. time slot and frequency, “codes”) are unique thereby not causing a collision during transmission of data.

and during a time span, any two different piconets in the set of piconets are capable of using one or more same bands for a collective time for each group of dwell times, no longer than the longest dwell time within such group of dwell times. Souissi et al. discloses two independent piconets will sometimes choose the same frequency channel during at least part of the same time slot (column 5 line 31-33). However, Souissi et al. does not disclose no longer than the longest dwell time within such group of dwell times. Panaski et al. discloses having a a master-slave dwelling technique in which the master and slave a transmitting on the on the same frequency within the same dwell time (fig. 2B and page 6 paragrph 30 line 1-8-10).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a time slot as taught by Souissi et al. with a master and slave dwelling technique as taught by Panaski et al. to provide a technique that will increase performance gains and extend the range of operation.

an instruction for substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band Souissi et al. discloses having a wireless network utilizing a ISM band ... the overall communication load is spread over a wide frequency band by causing communicating devices to transmit on a given channel in the band and then hop to a different channel (column 4 line 5056). However, Souissi et al. does not explicitly disclose substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band. Kostic et al. discloses having a method and apparatus for implementing measurement based dynamic frequency hopping in wireless communication systems (title)... it also reduces interference in a frequency hopping wireless communication (abstract). Kostic et al. further discloses having a quality measurement module 424 then analyzes each frequency hop pattern using the rank information to identify terminal frequency hop patterns in which one or more frequencies should be replaced with system frequencies having higher quality values (lower interference levels)... frequency hop pattern adaptation module 426 determines which frequencies should be replaced (column 9 line 35-50). It is inferred the replaced frequencies can come from different frequencies band with the frequency spectrum.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a wireless network utilizing a ISM band whereby the overall communication load is spread over a wide frequency band as taught by Souissi et al. replacing frequencies according to their interference level as taught by

Kostic et al. increasing the efficiency of a wireless communication system by avoiding using frequencies with high interference levels.

With regard to claim 72, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the computer readable medium recited recited in claim 65. *wherein the cpmuter readable mediumfurther comprises an instruction for changing a state of a band within at least one of the codes for at least one piconet from a first state to a second state,*

wherein: the first state is a designated state or an undesignated state;

and the second state is the other of the designated state or the undesignated state.

Souissi et al. discloses having piconets 19,20, and 21 utilizing frequency jumps with time-slot-and-frequency combinations ("bands" column 4 line 59-65). Watanabeet al. discloses having a wireless communication of a spread spectrum communication system 11 that performs frequency hopping using a plurality of frequency channels having different frequencies and defined in a usable frequency band (Abstract). Watanabeet al. further discloses have a channel select process whereby is determined which communication channel is excluded from the frequency hopping sequence (column 7 paragraph 28 line 1-14).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a frequency jumps as taught by Souissi et al. excluding communication channels from the frequency hopping sequence as taught by Watanabeet al. to avoid channels that are not degraded by interference.

With regard to claim 74, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the computer readable medium recited recited in claim 65. *wherein each of the bands has a frequency range of at least 400 MHz.* Souissi et al. discloses the network may employ packet switching, wherin the time slots are defined by the frequency hopping intervals (in Bluetooth, 1600 hops per second in through an arbitrary order of sequential 1 Mhz channels 2.402 and 2.480 GHz, column 134 line 55-60). It is inferred that the frequency channels can be increased to allow transmission of more data and also the level of frequency is specific to the designer of the network.

With regard to claim 75, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the computer readable medium recited in claim 65.*wherein the set of piconets is designed for a wireless communicating medium.* Souissi et al. discloses having piconets 19, 20, and 21... also any of the communication devices can be become an access point or node through which devices communicate (column 3 line 56-67).

With regard to claim 76, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the computer readable medium recited recited in claim 65. *wherein the computer program further comprising an instruction for adding another piconet to the set of piconets, wherein the another piconet has a unique code compared to previously existing piconets within the set of piconets.* Souissi et al. discloses a given network ("piconet") can have one AP (access point) 48 or can have more than one , which are capable of joining or maintaining different piconets, which have different frequency

hopping sequence ("unique code", column 17 line 65-67 and column 18 line 1-14). It is inferred that the network ("piconet") joining another piconet will have the own unique frequency hopping sequence.

Claims 2-6, 14-18 and 66-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Souissi et al. (US Patent 6,920,171) and Panasik (EP 1119112 A2) and Kostick et al. (US Patent 6,549,784) as applied to claim 1 and 13 above, and further in view of Larioa et al. (US Patent 6,553,019).

With regard to claim 2, in combination Souissi et al., Panaski et al and. Kostic et al. teaches the method in claim 1. *wherein one or more numbers of the dwell times in the groups is one or more prime numbers.* Souissi et al. discloses having a time-slot-and frequency combinations ("dwell times"). However, Souissi et al. does not explicitly disclose wherein one or more numbers of the dwell times in the groups is one or more prime numbers. Laroia et al. discloses having a assignment and generation of hop sequences, in multicarrier spread spectrum systems (title). Laroia et al. further discloses in fig. 7 sequence assignment for a plurality of time slots ("dwell times", column 4 line 41-45). It is inferred that the time slots ("dwell times") has a possibility of being one or more prime number.

Souissi et al. and Laroia et al. discloses the claimed invention except for one or more prime numbers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to alternate the time slots to prevent collision or

interference within the frequency channels, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 3, , in combination Souissi et al., Panaski et al and. Kostic et al. and Laroia teaches the method in claim 2. *wherein the one or more number of the dwell times in each group is seven.* Souissi et al. discloses having a time-slot- and frequency combinations ("dwell times"). Laroia et al. discloses having a assignment and generation of hop sequences, in multicarrier spread spectrum systems (title). Laroia et al. further discloses in fig. 7 sequence assignment for a plurality of time slots ("dwell times", column 4 line 41-45).

Souissi et al. and Laroia et al. discloses the claimed invention except for dwell times in each group is seven. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a mechanism that will optimize the use of bandwidth in the frequency channels, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 4,in combination Souissi et al., Panaski et al. Kostic et al. and Larioa et al. teaches the method in claim 3. *wherein a number of different bands for the each group is seven.* Souissi et al. teaches that they are 79 channels and 1600 time slots per second provide many combinations timeslots and frequencies can be used in a piconet ("group", column 5 line 26-28). It is inferred that the number of bands

used in piconet ("group") can is desiner specific.

With regard to claim 5, in combination Souissi et al., Panaski et al. Kostic et al. and Larioa et al. teaches the method in claim 3. *wherein a number of different bands for the each group is six.* Souissi et al. teaches that they are 79 channels and 1600 time slots per second provide many combinations timeslots and frequencies can be used in a piconet ("group", column 5 line 26-28). It is inferred that the number of bands used in piconet ("group") can is designer specific.

With regard to claim 6, in combination Souissi et al., Panaski et al. Kostic et al. and Larioa et al. teaches the method in claim 3. *wherein a number of different bands for the each group is three.* Souissi et al. teaches that they are 79 channels and 1600 time slots per second provide many combinations timeslots and frequencies can be used in a piconet ("group", column 5 line 26-28). It is inferred that the number of bands used in piconet ("group") can is designer specific.

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With regard to claim 14, in combination Souissi et al., Panaski et al. Kostic et al. teaches the set of piconets recited in claim 13. *wherein one or more number of the dwell times in the groups is one or more prime numbers.* Souissi et al. discloses having a having a time-slot- and frequency combinations ("dwell times"). However, Souissi et al. does not explicitly disclose wherein one or more numbers of the dwell times in the groups is one or more prime numbers. Laroia et al. discloses having a assignment and

generation of hop sequences, in multicarrier spread spectrum systems (title). Laroia et al. further discloses in fig. 7 sequence assignment for a plurality of time slots ("dwell times", column 4 line 41-45). It is inferred that the time slots ("dwell times") has a possibility of being one or more prime number.

Souissi et al. and Laroia et al. discloses the claimed invention except for one or more prime numbers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to alternate the time slots to prevent collision or interference within the frequency channels, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 15, in combination Souissi et al., Panaski et al., Kostic et al. and Laroia et al. teaches the set of piconets recited in claim 14. *wherein the one or more number of the dwell times in each group is seven* discloses having a having a time-slot- and frequency combinations ("dwell times"). Laroia et al. discloses having a assignment and generation of hop sequences, in multicarrier spread spectrum systems (title). Laroia et al. further discloses in fig. 7 sequence assignment for a plurality of time slots ("dwell times", column 4 line 41-45). It is inferred that the time slots ("dwell times") has a possibility of being one or more prime number.

Souissi et al., Panaski et al. and Laroia et al. discloses the claimed invention except for dwell times in each group is seven. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a

mechanism that will optimize the use of bandwidth in the frequency channels, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 16, in combination Souissi et al., Panaski et al., Kostic et al. and Laroia et al. teaches the set of piconets recited in claim 15. *wherein a number of different bands for the each group is seven.* Souissi et al. teaches that they are 79 channels and 1600 time slots per second provide many combinations timeslots and frequencies can be used in a piconet ("group", column 5 line 26-28). It is inferred that the number of bands used in piconet ("group") can is vendor specific.

With regard to claim 17, in combination Souissi et al., Panaski et al., Kostic et al. and Laroia et al. teaches the set of piconets recited in claim 15. *wherein a number of different bands for the each group is six*. Souissi et al. teaches that they are 79 channels and 1600 time slots per second provide many combinations timeslots and frequencies can be used in a piconet ("group", column 5 line 26-28). It is inferred that the number of bands used in piconet ("group") can is vendor specific.

With regard to claim 18, in combination Souissi et al., Panaski et al., Kostic et al. and Laroia et al. teaches the set of piconets recited in claim 15. *wherein a number of different bands for the each group is three.* Souissi et al. teaches that they are 79 channels and 1600 time slots per second provide many combinations timeslots and

frequencies can be used in a piconet ("group", column 5 line 26-28). It is inferred that the number of bands used in piconet ("group") can is vendor specific.

With regard to claim 66, in combination Souissi et al., Panaski et al. and Kostic et al. teaches the computer readable medium recited in claim 65. *wherein one or more numbers of the dwell times in the groups is one or more prime numbers.* Souissi et al. discloses having a having a time-slot- and frequency combinations ("dwell times"). However, Souissi et al. does not explicitly disclose wherein one or more numbers of the dwell times in the groups is one or more prime numbers. Laroia et al. discloses having a assignment and generation of hop sequences, in multicarrier spread spectrum systems (title). Laroia et al. further discloses in fig. 7 sequence assignment for a plurality of time slots ("dwell times", column 4 line 41-45). It is inferred that the time slots ("dwell times") has a possibility of being one or more prime number.

Souissi et al., Panaski et al and Laroia et al. discloses the claimed invention except for one or more prime numbers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to alternate the time slots to prevent collision or interference within the frequency channels, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 67, in combination Souissi et al., Panaski et al., Kostic et al.. and Laroia et al. teaches the computer readable medium recited in claim 66. *wherein the one or more number of the dwell times in each group is seven.* Souissi et al. discloses having a having a time-slot- and frequency combinations ("dwell times"). Laroia et al. discloses having a assignment and generation of hop sequences, in multicarrier spread spectrum systems (title). Laroia et al. further discloses in fig. 7 sequence assignment for a plurality of time slots ("dwell times", column 4 line 41-45). It is inferred that the time slots ("dwell times") has a possibility of being one or more prime number.

Souissi et al., Panaski et al. and Laroia et al. discloses the claimed invention except for dwell times in each group is seven. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a mechanism that will optimize the use of bandwidth in the frequency channels, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 68, in combination Souissi et al., Panaski et al., Kostic et al. and Laroia et al. teaches the computer readable medium recited in claim recited in claim 67. *wherein a number of different bands for the each group is seven.* Souissi et al. teaches that they are 79 channels and 1600 time slots per second provide many combinations timeslots and frequencies can be used in a piconet ("group", column 5 line 26-28). It is inferred that the number of bands used in piconet ("group") can is designer

specific.

With regard to claim 69, in in combination Souissi et al., Panaski et al., Kostic et al. and Laroia et al. teaches computer readable medium recited in claim recited in claim 67. *wherein a number of different bands for the each group is six.* . Souissi et al. teaches that they are 79 channels and 1600 time slots per second provide many combinations timeslots and frequencies can be used in a piconet ("group", column 5 line 26-28). It is inferred that the number of bands used in piconet ("group") can is designer specific.

With regard to claim 70, in combination Souissi et al., Panaski et al., Kostic et al. and Laroia et al. teaches the computer readable medium recited in claim 67. *wherein a number of different bands for the each group is three.* Souissi et al. teaches that they are 79 channels and 1600 time slots per second provide many combinations timeslots and frequencies can be used in a piconet ("group", column 5 line 26-28). It is inferred that the number of bands used in piconet ("group") can is designer specific.

7. **Claims 24-28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanaba et al. (US Patent 6,731,939) in view of Karol et al. ("Time-Frequency-Code Slicing: Efficiently Allocating the Communications Spectrum to Multirate Users", 1995).

With regard to claim 24, Watanaba et al. discloses having a *set of piconets comprising a first piconet and a second piconet, wherein within the set of piconet;:*

Watanaba et al. discloses having a first piconet 58 and second piconet 62 (column 5 line 55-57).

the first piconet has a first code corresponding to a first sequence of designated bands; Watanaba et al. discloses having a first piconet 58 determines its frequency (“designated frequency”) which forms a sequence of the frequency hopping pattern (column 6 line 22-33). However, Watanaba et al. does not discloses having a first code corresponding to a first sequence. Karol et al. discloses having a time-frequency-code slicing technique... in fig. 3 an example of the time-frequency –system where a code space corresponds to a first sequence of designated bands (page 820 column 2).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have first piconet 58 with a frequency hopping sequence as taught by Watanaba et al. utilizing a time-frequency-code slicing technique as taught by Karol et al. to provide a technique that will allow user multi-rate user to access communication resources in a cost effective manner.

and the second piconet has a second code that corresponds to a second sequence of designated bands; and at least one band is present in the first sequence that is not present in the second sequence. Watanaba et al. discloses having a second piconet 62 determines its frequency (“designated frequency”) which forms a sequence of the frequency hopping pattern (column 6 line 22-33). However, Watanaba et al. does not discloses having a first code corresponding to a first sequence. Karol et al. discloses having a time-frequency-code slicing technique... in fig. 3 an example of the time-

frequency –system where a code space corresponds to a first sequence of designated bands (page 820 column 2).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have first piconet 58 with a frequency hopping sequence as taught by Watanaba et al. utilizing a time-frequency-code slicing technique as taught by Karol et al. to provide a technique that will allow user multi-rate user to access communication resources in a cost effective manner.

Wherein in response to interference, an extra band is substituted for an existing band of the first sequence of designated bands or the second sequence of designated bands, wherein before substituting, the code does not correspond to the extra band. Wattanaba et al. discloses having a hopping pattern provided for communications with mobile stations assigned to different ones of the piconet (column 3 line 16-18).However, Wattanaba et al. does not discloses in response to interference, an extra band is substituted for an existing band of the first sequence of designated bands or the second sequence of designated bands, wherein before substituting, the code does not correspond to the extra band. Kostic et al. discloses having a method and apparatus for implementing measurement based dynamic frequency hopping in wireless communication systems (title)...it also reduces interference in a frequency hopping wireless communication (abstract). Kostic et al. further discloses having a quality measurement module 424 then analyzes each frequency hop pattern using the rank information to identify terminal frequency hop patterns in which one or more frequencies should be replaced with system frequencies having higher quality values (lower

interference levels)... frequency hop pattern adaptation module 426 determines which frequencies should be replaced (column 9 line 35-50). It is inferred the replaced frequencies can come from different frequencies band with the frequency spectrum.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a hopping pattern as taught by Wattanaba et al. replacing frequencies according to their interference level as taught by Kostic et al. increasing the efficiency of a wireless communication system by avoiding using frequencies with high interference levels.

With regard to claim 25, in combination Watanaba et al., Karol et al. and Kostick et al. teaches the set of piconets recited in claim 24.*wherein: the first piconet is configured for a first group of bands and a second group of bands;* Watanaba et al. discloses having first piconet 58 and second piconet 62 (column 5 line 55-57) with a frequency hopping pattern (column 5 line 25-31). However, Watanaba et al. does not explicitly discloses configuring for a *first group of bands and a second group of bands; and the second piconet is configured for the first group of bands but not the second group of bands.* Karol discloses having users using high date rates utilizing different frequency bands (page 818 line 1-11). Karol further discloses having frequency bands allocated to different users in fig. 1, some users are allocate one or more frequency bands.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have first piconet 58 and second piconet 62 with a frequency hopping sequence as taught by Watanaba et al. configuring a group of frequency bands as taught by Karol to reduce interference in the frequency channels.

With regard to claim 26, in combination Watanaba et al., Karol et al. and Kostick et al. teaches the set of piconets recited in claim 25. *wherein at least one of the bands within the first group of bands is in an undesignated state.* Watanaba et al. discloses having a frequency pattern for a first and second piconet , the pattern consist of undesignated frequencies (column 6 line 26-31).

With regard to claim 27, in combination Watanaba et al., Karol et al. and Kostick et al. teaches the set of piconets recited in claim 25.*wherein each of the first group of bands and the second group of bands comprise a prime number of bands.* Watanaba et al. discloses a first and second group of bands with prime numbers in fig. 6.

With regard to claim 28, in combination Watanaba et al., Karol et al. and Kostick et al. teaches the set of piconets recited in claim 24. *wherein the first and second piconets correspond to the same group or groups of bands* . Watanaba et al. discloses having a group of bands configured for piconet 1-3 in fig. 6.

8. **Claims 29,41, 53,30,42, 54, 31,43, 55, 32, 44,56,37,47 and 59** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shellhammer et al. (US Patent 7,039,358) in view of Zyren (US Patent 6,377,608).

With regard to claim 29 and 41 Shellhammer et al. discloses having *method of using a set of piconets comprising changing a first band from a designated state to an undesignated state, so that a first piconet cannot communicate within the set of piconets using the first band; wherein: the set of piconets comprises the first piconet;* Shellhammer et al. discloses having a techniques that coordinate frequencies among two different wireless network protocols (Abstract). Shellhammer et al. further discloses having in fig. 1 a set of piconet 280 and 290 ("first piconet") are radiating in the 2.GHz ISM band (column 7 line 39)...the frequency f(n) is checked to see if its clear ("designated state") and not cleared ("undesignated state", column 8 line 2467). It is inferred that if the frequency channel is not cleared the first piconet cannot communicate. However, Shellhammer et al. does not explicitly disclose that a first piconet cannot communicate within the set of piconets using the first band.

Zyren discloses having a WLAN infrastructure 20 and piconets 10...multiple devices operating in the same unlicensed frequency band (i.e. 2.400-2.4835 GHZ) as Bluetooth, HomeRF, and IEEE 802.11 specifications-based frequency hopped spread spectrum (FHSS) radios (column 1 line 43).Zyren further discloses having a altered hop pattern mode which changes hop sequences to avoid interference...the advantage to this approach is that the band occupied by the infrastructure network (e.g. WLAN infrastructure 20) may be avoided completely (column 7 line 65-67 and column 8 line 1-

8).It is inferred the piconets 10 can be configured to operate in a second frequency band.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a piconet 280 ("first piconet") as taught by Shellhammer et al. avoiding the frequency band the band occupied by the infrastructure network (e.g. WLAN infrastructure 20) to avoid interference as taught by Zyren to reduce the potential for or avoiding interference between wireless communication devices using unlicensed industrial, scientific and medical (ISM band)

each piconet in the set of piconets has a unique code compared to the other piconets in the set of piconets, wherein the each unique code corresponds to a sequence of dwell times and bands including the first band, wherein the sequence includes at least one group of dwell times. Shellhammer et al. discloses having in fig. 1 a set of piconet 280 and 290 ("set of piconet") with timeslots(dwell times") and frequencies ("bands") which makes up a time-frequencies codes ("unique code").

<u>substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band.</u> Shellhammer et al. discloses having in fig. 1 a set of piconet 280 and 290 ("set of piconet") with timeslots(dwell times") and frequencies ("bands") which makes up a time-frequencies codes ("unique code"). However, Shellhammer et al. does not disclose substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band. Kostick et al. discloses having a method and apparatus for implementing measurement based dynamic frequency hopping in wireless communication systems (

title)... it also reduces interference in a frequency hopping wireless communication (abstract). Kostic et al. further discloses having a quality measurement module 424 then analyzes each frequency hop pattern using the rank information to identify terminal frequency hop patterns in which one or more frequencies should be replaced with system frequencies having higher quality values (lower interference levels)... frequency hop pattern adaptation module 426 determines which frequencies should be replaced (column 9 line 35-50). It is inferred the replaced frequencies can come from different frequencies band with the frequency spectrum.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a timeslots(dwell times") and frequencies ("bands") which makes up a time-frequencies codes ("unique code") taught by Shellhammer et al. replacing frequencies according to their interference level as taught by Kostic et al. increasing the efficiency of a wireless communication system by avoiding using frequencies with high interference levels.

With regard to claim 30, 42, and 54, in combination Shellhammer et al. Zyren and Kostick et al. teaches the method recited in claim 29. *further comprising transmitting data within the first piconet using a second band, wherein: the unique code for the first piconet corresponds to the second band;* Shellhammer et al. discloses having a piconet 280 ("first piconet"). Shellhammer et al. further discloses that piconets 208 and 290 which includes a plurality of devices thereby using the same frequency

band which comprises two or more sub bands (column 3 line 21-26)...also an access point using a first wireless data communication protocol (such as 802.11) in first frequency band and communicate with other devices using a second wireless data communication protocol (such as Bluetooth) in the first frequency band (column 5 line 12-17). However, Shellhammer et al. does not explicitly disclose transmitting data within the first piconet using a second band. Zyren discloses having a WLAN infrastructure 20 and piconets 10...multiple devices operating in the same unlicensed frequency band (i.e. 2.400-2.4835 GHZ) as Bluetooth, HomeRF, and IEEE 802.11 specifications-based frequency hopped spread spectrum (FHSS) radios (column 1 line 43). Zyren further discloses having a altered hop pattern mode which changes hop sequences to avoid interference...the advantage to this approach is that the band occupied by the infrastructure network (e.g. WLAN infrastructure 20) may be avoided completely (column 7 line 65-67 and column 8 line 1-8).It is inferred the piconets 10 can be configured to operate in a second frequency band.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a piconet 280 ("first piconet") as taught by Shellhammer et al. avoiding the frequency band the band occupied by the infrastructure network (e.g. WLAN infrastructure 20) to avoid interference as taught by Zyren to reduce the potential for or avoiding interference between wireless communication devices using unlicensed industrial, scientific and medical (ISM band).

the second band is in the designated state when transmitting is performed; Shellhammer et al. discloses master have the cleared slave#1 to transmit on frequency f(n+1) (column 8 line 28-31).

and transmitting is performed after changing the first band from the designated state to the undesignated state; Shellhammer et al discloses the master makes sure prior to transmitting on frequency f(n) is clear. If frequency bands f(n) and F(fn+1) are clear then the master transmit on frequency band f(n) (column 8 line 41-47).

With regard to claim 31, 43 and 55, in combination Shellhammer et al. Zyren and Kostick et al. teaches the method recited in claim 30. *wherein the data that would be transmitted using the first band, if the first band would be in the designated state, is transmitted using the second band.* Shellhammer et al. discloses having BTM 130,150 and the associated MU 120, 140 attempt to operate at the exact same time. Since the two devices operate in the same frequency 2.04 GHz ISM frequency band (column 6 line 29-32)...also the 802.11 AP 20,30 and Mus 120, 140 may be designed to operate in one portion of the 2.4 GHz spectrum, while the BTMs 130,150 and BTSs 160,170,190,200,210 may designed to operate in another portion of the 2.04 GHZ spectrum. Shellhammer et al. further discloses the BTMs 130, 150 may be equipped with a look-ahead function to determine which frequencies within the 2.4 GHz band will be used for two or more future Bluetooth frequency hops to occur. It is inferred the frequency coordination within the network during transmission of data that either device

transmitting in the first band can switch to the second band first band is occupied.

With regard to claim 32, 44 and 56, in combination Shellhammer et al. Zyren and Kostick et al. teaches the method recited in claim 31.*further comprising changing the first band from the undesignated state to the designated state after transmitting the data.* Shellhammer et al. discloses having BTM 130,150 and the associated MU 120, 140 attempt to operate at the exact same time. Since the two devices operate in the same frequency 2.04 GHz ISM frequency band(column 6 line 29-32). Shellhammer et al. discloses having a clear frequency band ("designated") after transmission of data (column 8 line 24-51).

With regard to claim 35,47 and 59, in combination Shellhammer et al. Zyren and Kostick et al. teaches the method recited in claim 29. *further comprising Communicating simultaneously over at least two bands using a device within the first piconet.* Shellhammer et al. discloses having a piconet 280 ("first piconet")...also all the Bluetooth devices hop in unison...a device hops along it sequence of frequienes f(1) , f(2), ...f(n)...(column 7 line 36-67). It is inferred the devices within a Bluetooth piconet (e.g. piconet 280) is a capable of communicating simultaneously over plurality of frequency bands.

9. **Claims 36** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shellhammer et al. (US Patent 7,039,358) and Zyren (US Patent 6,377,608) and

Kostick et al. (US Patent 6,549,784) as applied to claim 29, 41 and 53 above, and further in view of Larsson et al. (PG PUB 2004/0196784).

With regard to claim 36 ,48 and 60, in combination Shellhammer et al. Zyren and Kostick et al. teaches the method recited in claim 29. *further comprising adding another piconet to the set of piconets, wherein the another piconet has its own unique code compared to the unique codès for previously existing piconets within the set of piconets.* Shellhammer et al. discloses having a system comprised of piconets 280 and 290 (fig.1)...with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes") . However, Shellhammer et al. does not disclose adding another piconet to the set of piconets, wherein the another piconet has its own unique code compared to the unique codes for previously existing piconets within the set of piconets. Larsson et al. discloses having mechanism to creation of new piconets (page 4 paragraph 49).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes") as taught by Shellhammer et al. with a mechanism to create a new piconet as taught by Larsson et al. to provide a system that is flexible in adding addition pionets to seamlessly operate in the system.

10. **Claims 37, 49 and 61** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shellhammer et al. (US Patent 7,039,358) and Zyren (US Patent 6,377,608) and Kostick et al. (US Patent 6,549,784) as applied to claim 29, 41 and 53 above, and further in view of Laroia et al. (US Patent 6,553,019)

With regard to claim 37, 49 and 61, in combination Shellhammer et al. Zyren and Kostick et al. teaches the method recited in claim 29. *wherein a number of the dwell times in each group is seven.* Shellhammer et al. discloses having a of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes" column 4 line 12-34). However, Shellhammer et al. does not disclose having a number of the dwell times in each group is seven. Laroia et al. discloses having a assignment and generation of hop sequences, in multicarrier spread spectrum systems (title). Laroia et al. further discloses in fig. 7 sequence assignment for a plurality of time slots ("dwell times", column 4 line 41-45).

Shellhammer et al., Zyren and Laroia et al. discloses the claimed invention except for dwell times in each group is seven. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a mechanism that will optimize the use of bandwidth in the frequency channels, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

11. **Claims 38,50,62, 39,51, 63, and 40** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shellhammer et al. (US Patent 7,039,358) and Zyren (US Patent 6,377,608) and Kostick et al. (US Patent 6,549,784) and Laroia et al. (US Patent 6,553,019) as applied to claim 29, 41, 53 and 37 above, and further in view of Mattisson (US Patent 6,246,713).

With regard to claim 38, 50 and 62, in combination Shellhammer et al. Zyren , Kostick et al. and Laroia et al. teaches the method recited in claim 37. *wherein a number of different bands for the each group is seven.* Shellhammer et al. discloses having a of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes" column 4 line 12-34). However, Shellhammer et al. does not disclose having a number of different bands for the each group is seven. Mattisson discloses having allocating 12 different frequency bands (column 4 line 13-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes") as taught by Shellhammer et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

With regard to claim 39,51 and 63, , in combination Shellhammer et al. Zyren , Kostick et al. and Laroia et al. teaches the method recited in claim 37. *wherein a number of different bands for the each group is six.* Shellhammer et al. discloses having a of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes" column 4 line 12-34). However, Shellhammer et al. does not disclose having a number of different bands for the each group is six. Mattisson discloses having allocating 12 different frequency bands (column 4 line 13-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes") as taught by Shellhammer et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

With regard to claim 40, in combination Shellhammer et al. Zyren , Kostick et al. and Laroia et al. teaches the method recited in claim 37. *wherein a number of different bands for the each group is three.* Shellhammer et al. discloses having a of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes" column 4 line 12-34). However, Shellhammer et al. does not

disclose having a number of different bands for the each group is three. Mattisson discloses having allocating 12 different frequency bands (column 4 line 13-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes") as taught by Shellhammer et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

12. Claims 77, 78, 88,89,79,90,80 and 91 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shellhammer et al. (US Patent 7,039,358) in view of Zyren (US Patent 6,377,608) and Kostick et al. (US Patent 6,549,784).

With regard to claim 77 and 88, Shellhammer et al. discloses having a *computer readable medium storing computer executable instructions executable for using a set of piconets, the computer executable instructions comprising:*

an instruction for changing a first band from a designated state to an undesignated state, so that the first piconet cannot communicate within a set of piconets using the first band, wherein: the set of piconets comprises the first piconet;
Shellhammer et al. discloses having a techniques that coordinate frequencies among

two different wireless network protocols (Abstract). Shellhammer et al. further discloses having in fig. 1 a set of piconet 280 and 290 ("first piconet") are radiating in the 2.GHz ISM band (column 7 line 39)...the frequency f(n) is checked to see if its clear ("designated state") and not cleared ("undesignated state", column 8 line 2467). It is inferred that if the frequency channel is not cleared the first piconet cannot communicate. However, Shellhammer et al. does not explicitly disclose that a first piconet cannot communicate within the set of piconets using the first band.

Zyren discloses having a WLAN infrastructure 20 and piconets 10...multiple devices operating in the same unlicensed frequency band (i.e. 2.400-2.4835 GHZ) as Bluetooth, HomeRF, and IEEE 802.11 specifications-based frequency hopped spread spectrum (FHSS) radios (column 1 line 43).Zyren further discloses having a altered hop pattern mode which changes hop sequences to avoid interference...the advantage to this approach is that the band occupied by the infrastructure network (e.g. WLAN infrastructure 20) may be avoided completely (column 7 line 65-67 and column 8 line 1-8).It is inferred the piconets 10 can be configured to operate in a second frequency band.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a piconet 280 ("first piconet") as taught by Shellhammer et al. avoiding the frequency band the band occupied by the infrastructure network (e.g. WLAN infrastructure 20) to avoid interference as taught by Zyren to reduce the potential for or avoiding interference between wireless communication devices using unlicensed industrial, scientific and medical (ISM band)

each piconet in the set of piconets has a unique code compared to the other piconets in the set of piconets, wherein the each unique code corresponds to a sequence of dwell times and bands including the first band, wherein the sequence includes at least one group of dwell times; Shellhammer et al. discloses having in fig. 1 a set of piconet 280 and 290 ("set of piconet") with timeslots(dwell times") and frequencies ("bands") which makes up a time-frequencies codes ("unique code").

and for the first piconet, the first band is in a designated state before executing the instruction for changing. Shellhammer et al. discloses having a piconet 280 ("first piconet") that includes BTM (Bluetooth master) transmitting in a frequency band that is in a designated state (column 8 line 52-67 and fig.3)

<u>an instruction substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band.</u> Shellhammer et al. discloses having in fig. 1 a set of piconet 280 and 290 ("set of piconet") with timeslots(dwell times") and frequencies ("bands") which makes up a time-frequencies codes ("unique code"). However, Shellhammer et al. does not disclose having an instruction substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band. Kostick et al. discloses having a method and apparatus for implementing measurement based dynamic frequency hopping in wireless communication systems (title)...it also reduces interference in a frequency hopping wireless communication (abstract). Kostic et al. further discloses having a quality measurement module 424 then analyzes each frequency hop pattern using the

rank information to identify terminal frequency hop patterns in which one or more frequencies should be replaced with system frequencies having higher quality values (lower interference levels)... frequency hop pattern adaptation module 426 determines which frequencies should be replaced (column 9 line 35-50). It is inferred the replaced frequencies can come from different frequencies band with the frequency spectrum.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a timeslots(dwell times") and frequencies ("bands") which makes up a time-frequencies codes ("unique code") taught by Shellhammer et al. replacing frequencies according to their interference level as taught by Kostic et al. increasing the efficiency of a wireless communication system by avoiding using frequencies with high interference levels.

With regard to claim 78 and 89, in combination Shellhammer et al., Zyren and Kostick et al. teaches the computer readable medium recited in claim 77.*wherein the computer program further comprises an instruction for transmitting data within the first piconet using a second band, wherein: the unique code for the first piconet corresponds to the*

second band; Shellhammer et al. discloses having a piconet 280 ("first piconet"). Shellhammer et al. further discloses that piconets 208 and 290 which includes a plurality of devices thereby using the same frequency band which comprises two or more sub bands (column 3 line 21-26)...also an access point using a first wireless data

communication protocol (such as 802.11) in first frequency band and communicate with other devices using a second wireless data communication protocol (such as Bluetooth) in the first frequency band (column 5 line 12-17). However, Shellhammer et al. does not explicitly disclose transmitting data within the first piconet using a second band. Zyren discloses having a WLAN infrastructure 20 and piconets 10...multiple devices operating in the same unlicensed frequency band (i.e. 2.400-2.4835 GHZ) as Bluetooth, HomeRF, and IEEE 802.11 specifications-based frequency hopped spread spectrum (FHSS) radios (column 1 line 43). Zyren further discloses having a altered hop pattern mode which changes hop sequences to avoid interference...the advantage to this approach is that the band occupied by the infrastructure network (e.g. WLAN infrastructure 20) may be avoided completely (column 7 line 65-67 and column 8 line 1-8).It is inferred the piconets 10 can be configured to operate in a second frequency band.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a piconet 280 ("first piconet") as taught by Shellhammer et al. avoiding the frequency band the band occupied by the infrastructure network (e.g. WLAN infrastructure 20) to avoid interference as taught by Zyren to reduce the potential for or avoiding interference between wireless communication devices using unlicensed industrial, scientific and medical (ISM band).

the second band is in the designated state when transmitting is performed;

Shellhammer et al. discloses master have the cleared slave#1 to transmit on frequency f(n+1) (column 8 line 28-31).

and the instruction for transmitting is executed after the instruction for changing the first band from the designated state to the undesignated state is executed. Shellhammer et al discloses the master makes sure prior to transmitting on frequency f(n) is clear. If frequency bands f(n) and f(n+1) are clear then the master transmit on frequency band f(n) (column 8 line 41-47).

With regard to claim 79 and 90, in combination Shellhammer et al., Zyren and Kostick et al. teaches the computer readable medium recited in claim 78. *wherein the data that would be transmitted using the first band, if the first band would be in the designated state, is capable of being transmitted using the second band when the instruction for transmitting is executed.* Shellhammer et al. discloses having BTM 130,150 and the associated MU 120, 140 attempt to operate at the exact same time. Since the two devices operate in the same frequency 2.04 GHz ISM frequency band(column 6 line 29-32)...also the 802.11 AP 20,30 and Mus 120, 140 may be designed to operate in one portion of the 2.4 GHz spectrum, while the BTMs 130,150 and BTSs 160,170,190,200,210 may designed to operate in another portion of the 2.04 GHZ spectrum . Shellhammer et al. further discloses the BTMs 130, 150 may be equipped with a look-ahead function to determine which frequencies within the 2.4 GHz band will be used for two or more future Bluetooth frequency hops to occur. It is inferred the frequency coordination within the network during transmission of data that either device transmitting in the first band can switch to the second band first band is occupied.

With regard to claim 80 and 91, in combination Shellhammer et al., Zyren and Kostick et al. teaches the computer readable medium recited in claim 78. *wherein the computer further comprises an instruction for changing the first band from the undesignated state to the designated state after executing the instruction for transmitting the data.* Shellhammer et al. discloses having BTM 130,150 and the associated MU 120, 140 attempt to operate at the exact same time. Since the two devices operate in the same frequency 2.04 GHz ISM frequency band(column 6 line 29-32). Shellhammer et al. discloses having a clear frequency band ("designated") after transmission of data (column 8 line 24-51).

13. Claims 83 and 94 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shellhammer et al. (US Patent 7,039,358) in view of Zyren (US Patent 6,377,608) and Kostick et al. (US Patent 6,549,784) as applied to claim 77 and 88 above, and further in view of Larsson et al. (PG PUB 2004/0196784).

With regard to claim 83 and 94, in combination Shellhammer et al., Zyren and Kostick et al. teaches the computer readable medium recited in claim 77. *wherein the computer readable medium further comprises an instruction for adding another piconet to the set of piconets, wherein the another piconet has its own unique code compared to the unique codes for previously existing piconets within the set of piconets. . further comprising adding another piconet to the set of piconets, wherein the another piconet has its own unique code compared to the unique codes for previously existing piconets*

within the set of piconets. Shellhammer et al. discloses having a system comprised of piconets 280 and 290 (fig.1)...with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes") . However, Shellhammer et al. does not disclose adding another piconet to the set of piconets, wherein the another piconet has its own unique code compared to the unique codes for previously existing piconets within the set of piconets. Larsson et al. discloses having mechanism to creation of new piconets (page 4 paragraph 49).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes") as taught by Shellhammer et al. with a mechanism to create a new piconet as taught by Larsson et al. to provide a system that is flexible in adding addition pionets to seamlessly operate in the system.

14. Claims 84 and 95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shellhammer et al. (US Patent 7,039,358) and Zyren (US Patent 6,377,608) and Kostick (US Patent 6,549,784) as applied to claim 77 above, and further in view of Laroia et al. (US Patent 6,553,019).

With regard to claim 84, in combination Shellhammer et al., Zyren and Kostick et al. teaches the computer readable medium recited in claim 77. *wherein one or more numbers of the dwell times in the groups is one or more prime numbers.* Shellhammer

et al. discloses having a of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes" column 4 line 12-34). However, Shellhammer et al. does not disclose having a number of the dwell times in each group is seven. Laroia et al. discloses having a assignment and generation of hop sequences, in multicarrier spread spectrum systems (title). Laroia et al. further discloses in fig. 7 sequence assignment for a plurality of time slots ("dwell times", column 4 line 41-45). It is inferred that the time slots ("dwell times") has a possibility of being one or more prime number.

Shellhammer et al., Zyren and Laroia et al. discloses the claimed invention except for one or more prime numbers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to alternate the time slots to prevent collision or interference within the frequency channels, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 95, in combination Shellhammer et al., Zyren, Kostick et al. and Laroia et al. teaches the computer readable medium recited in claim 84. *wherein a number of the dwell times in each group is seven.* Shellhammer et al. discloses having a of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes" column 4 line 12-34). However, Shellhammer et al. does not disclose having a number of the dwell times in each group is seven. Laroia et al. discloses having a assignment and generation of hop sequences,

in multicarrier spread spectrum systems (title). Laroia et al. further discloses in fig. 7 sequence assignment for a plurality of time slots ("dwell times", column 4 line 41-45).

Shellhammer et al., Zyren, Kostick et al. and Laroia et al. discloses the claimed invention except for dwell times in each group is seven. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a mechanism that will optimize the use of bandwidth in the frequency channels, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

15. Claims 85,96,86,97,87 and 98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shellhammer et al. (US Patent 7,039,358) and Zyren (US Patent 6,377,608) and Kostick et al. (US patent 6,549,784) and Laroia et al. (US Patent 6,553,019) as applied to claim 84 above, and further in view of Mattisson (US Patent 6,246,713).

With regard to claim 85 and 96, in combination Shellhammer et al., Zyren, Kostick et al. and Laroia et al. teaches the computer readable medium recited in claim 84. *wherein a number of different bands for the each group is seven.* Shellhammer et al. discloses having a of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes" column 4 line 12-34). However, Shellhammer et al. does not disclose having a number of different bands for the each group is seven. Mattisson discloses having allocating 12 different frequency bands

(column 4 line 13-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes") as taught by Shellhammer et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

With regard to claim 86 and 97, in combination Shellhammer et al., Zyren, Kostick et al. and Laroia et al. teaches the computer readable medium recited in claim 84. *wherein a number of different bands for the each group is six.* Shellhammer et al. discloses having a of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes" column 4 line 12-34). However, Shellhammer et al. does not disclose having a number of different bands for the each group is six. Mattisson discloses having allocating 12 different frequency bands (column 4 line 13-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 280 and 290 (fig.1) with

a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes") as taught by Shellhammer et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

With regard to claim 87 and 98, in combination Shellhammer et al., Zyren, Kostick et al. and Laroia et al. teaches the computer readable medium recited in claims 84 and 88. *wherein a number of different bands for the each group is three.* Shellhammer et al. discloses having a of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes" column 4 line 12-34). However, Shellhammer et al. does not disclose having a number of different bands for the each group is three. Mattisson discloses having allocating 12 different frequency bands (column 4 line 13-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 280 and 290 (fig.1) with a frequency hop pattern at a hop rate corresponding to the time slots ("unique codes") as taught by Shellhammer et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

16. Claims 99-107 and 110-113 are rejected under 35 U.S.C. 103(a) as being unpatentable over Souissi et al. (US Patent 6,920,171) in view of Mattisson (US Patent 6,246,713).

With regard to claim 99, Souissi et al. discloses having a *piconet comprising a code that corresponds to the utilization of different bands during a time span of seven dwell times.* Souissi et al. discloses having piconet 19,20 and 21 (fig. 1) with time-slot-and-frequencies combinations ("codes") that corresponds to a time span (fig.3). However, Souissi et al. does not explicitly disclose having a time spam of seven dwell times. Mattisson discloses having frequency bands used in a hop period. It is inferred the frequency bands corresponds to a time slot in which the frequency can be used.

Souissi et al. and Mattisson discloses the claimed invention except for dwell times in each group is seven. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a mechanism that will optimize the use of bandwidth in the frequency channels, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Wherein in response to interference an extra band is substituted for an exististing band, wherein before substituting, the code does not correspond to the utilization of the extra band. Souissi et al. discloses having a wireless network utilizing a ISM band ...the overall communication load is spread over a wide frequency band by causing communicating devices to transmit on a given channel in the band and then hop to a

different channel (column 4 line 5056). However, Souissi et al. does not explicitly disclose substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band. Kostic et al. discloses having a method and apparatus for implementing measurement based dynamic frequency hopping in wireless communication systems (title)...it also reduces interference in a frequency hopping wireless communication (abstract). Kostic et al. further discloses having a quality measurement module 424 then analyzes each frequency hop pattern using the rank information to identify terminal frequency hop patterns in which one or more frequencies should be replaced with system frequencies having higher quality values (lower interference levels)... frequency hop pattern adaptation module 426 determines which frequencies should be replaced (column 9 line 35-50). It is inferred the replaced frequencies can come from different frequencies band with the frequency spectrum.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a wireless network utilizing a ISM band whereby the overall communication load is spread over a wide frequency band as taught by Souissi et al. replacing frequencies according to their interference level as taught by Kostic et al. increasing the efficiency of a wireless communication system by avoiding using frequencies with high interference levels.

With regard to claim 100, in combination Souissi et al. Mattisson and Kostick et al. teaches the piocnet recited in claim 99. *wherein a number of the different bands is seven.* Souissi et al. discloses having a piconets 19,20, and 21 in fig. 1... frequency hopping schemes (e.g. time slot and frequency,) which includes 130,000 choices of time-slot-and-frequency combinations ("unique codes", column 4 line 59-67). It is inferred that the frequency hopping schemes (e.g. time slot and frequency, "codes") are unique thereby not causing a collision during transmission of data. However, Souissi et al. does not disclose having a number of the different bands is seven. Mattisson discloses having allocating 11 different frequency bands (column 5 line 17-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a system comprised of piconets 19,20 and 21 (fig.2) with a time-frequency sequence ("unique codes") as taught by Souissi et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

With regard to claim 101, in combination Souissi et al. Mattisson and Kostick et al. teaches the piconet recited in claim 99. *wherein a number of the different bands is six.* Souissi et al. discloses having a piconets 19,20, and 21 in fig. 1... frequency

hopping schemes (e.g. time slot and frequency,) which includes 130,000 choices of time-slot-and-frequency combinations ("unique codes", column 4 line 59-67). It is inferred that the frequency hopping schemes (e.g. time slot and frequency, "codes") are unique thereby not causing a collision during transmission of data. However, Souissi et al. does not disclose having a number of the different bands is six.

Mattisson discloses having allocating 12 different frequency bands column 5 line 17-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 19,20 and 21 (fig.2) with a time-frequency sequence ("unique codes") as taught by Souissi et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

With regard to claim 102, in combination Souissi et al. Mattisson and Kostick et al. teaches the piconet recited in claim 99. *wherein a number of the different bands is three.* Souissi et al. discloses having a piconets 19,20, and 21 in fig. 1... frequency hopping schemes (e.g. time slot and frequency,) which includes 130,000 choices of time-slot-and-frequency combinations ("unique codes", column 4 line 59-67). It is inferred that the frequency hopping schemes (e.g. time slot and frequency, "codes") are

unique thereby not causing a collision during transmission of data. However, Souissi et al. does not disclose having a number of the different bands is three.

Mattisson discloses having allocating 12 different frequency bands column 5 line 17-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 19,20 and 21 (fig.2) with a time-frequency sequence ("unique codes") as taught by Souissi et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

With regard to claim 103, in combination Souissi et al. Mattisson and Kostick et al. teaches the piconet recited in claim 99.further comprising at least two devices wherein each of the devices is capable of communicating to each other using the piconet. Souissi et al. discloses in fig. 3 an example of a number of APs (access points) are operating at the same time to maintain piconets, and are in sufficient proximity to communicate on the same frequency channels (column 13 line 48-51).

With regard to claim 104, Souissi et al. discloses having a method of using a piconet comprising: assigning a code to a first device within the piconet, wherein the

code corresponds to the utilization of different bands during a time span of seven dwell times; communicating using the first device to at least one other device using the piconet. Souissi et al. discloses having piconets 19,20,and 21 (fig.1) includes mobile devices which are assigned time-slot-and frequency combinations ("codes", column 4 line 59-67)...communication devices transmit on a given channel in the band and then hop to different channel to resume communicatios (i.e. to transmit the next packet)...a master and slave in communication with one another (column 4 line 25-27). However, Souissiet does not disclose the code corresponds to the utilization of different bands during a time span of seven dwell times. Mattisson discloses having a 11 frequency bands allocated to different users per hop (column 5 line 17-24). It is known in the art the hop sequence corresponds to a time slot , each frequency channel has a time to be used.

Souissi et al. and Mattisson teaches the claimed invention except for of different bands during a time span of seven dwell times. It would have been obvious to one having ordinary skill in the art at the time the invention was made to limit the time slots since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

<u>substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band.</u> Souissi et al. discloses having a wireless network utilizing a ISM band ...the overall communication load is spread over a wide

frequency band by causing communicating devices to transmit on a given channel in the band and then hop to a different channel (column 4 line 5056). However, Souissi et al. does not explicitly disclose substituting an extra band for an existing band wherein before substituting , the unique codes do not correspond to the extra band. Kostic et al. discloses having a method and apparatus for implementing measurement based dynamic frequency hopping in wireless communication systems (title)...it also reduces interference in a frequency hopping wireless communication (abstract). Kostic et al. further discloses having a quality measurement module 424 then analyzes each frequency hop pattern using the rank information to identify terminal frequency hop patterns in which one or more frequencies should be replaced with system frequencies having higher quality values (lower interference levels)... frequency hop pattern adaptation module 426 determines which frequencies should be replaced (column 9 line 35-50). It is inferred the replaced frequencies can come from different frequencies band with the frequency spectrum.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a wireless network utilizing a ISM band whereby the overall communication load is spread over a wide frequency band as taught by Souissi et al. replacing frequencies according to their interference level as taught by Kostic et al. increasing the efficiency of a wireless communication system by avoiding using frequencies with high interference levels.

With regard to claim 105, in combination Souissi et al. Mattisson and Kostick et al. teaches the piconet recited in claim 104. *wherein a number of the different bands is seven.* Souissi et al. discloses having a piconets 19,20, and 21 in fig. 1... frequency hopping schemes (e.g. time slot and frequency,) which includes 130,000 choices of time-slot-and-frequency combinations ("unique codes", column 4 line 59-67). It is inferred that the frequency hopping schemes (e.g. time slot and frequency, "codes") are unique thereby not causing a collision during transmission of data. However, Souissi et al. does not disclose having a number of the different bands is seven. Mattisson discloses having allocating 12 different frequency bands (column 4 line 13-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 19,20 and 21 (fig.2) with a time-frequency sequence ("unique codes") as taught by Souissi et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

With regard to claim 106, in combination Souissi et al. Mattisson and Kostick et al. teaches the piconet recited in claim 104. *wherein a number of the different bands is*

six. Souissi et al. discloses having a piconets 19,20, and 21 in fig. 1... frequency hopping schemes (e.g. time slot and frequency,) which includes 130,000 choices of time-slot-and-frequency combinations ("unique codes", column 4 line 59-67). It is inferred that the frequency hopping schemes (e.g. time slot and frequency, "codes") are unique thereby not causing a collision during transmission of data. However, Souissi et al. does not disclose having a number of the different bands is six. Mattisson discloses having allocating 12 different frequency bands (column 4 line 13-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 19,20 and 21 (fig.2) with a time-frequency sequence ("unique codes") as taught by Souissi et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

With regard to claim 107, in combination Souissi et al. Mattisson and Kostick et al. teaches the piconet recited in claim 104. *wherein a number of the different bands is three.* Souissi et al. discloses having a piconets 19,20, and 21 in fig. 1... frequency hopping schemes (e.g. time slot and frequency,) which includes 130,000 choices of time-slot-and-frequency combinations ("unique codes", column 4 line 59-67). It is

inferred that the frequency hopping schemes (e.g. time slot and frequency, "codes") are unique thereby not causing a collision during transmission of data. However, Souissi et al. does not disclose having a number of the different bands is three. Mattisson discloses having allocating 12 different frequency bands (column 4 line 13-64 and fig. 2 and 3). It is inferred the number of bands allocated is designer specific and that the number can be reduced or increased to an optimal level according to the mobile system specification.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to system comprised of piconets 19, 20 and 21 (fig.2) with a time-frequency sequence ("unique codes") as taught by Souissi et al. allocating a different frequencies to different users ("groups") as taught by Mattisson to provide a mechanism whereby enable user to simultaneously utilize more than one channel during a time slot.

With regard to claim 110, in combination Souissi et al. Mattisson and Kostick et al. teaches the method recited in claim 104.*wherein communicating comprises communicating simultaneously over at least two bands using the first device within the piconet.* Souissi et al. discloses having devices 29 and 28 respectively, operate simultaneously as a slave on two different piconets (column 9 line 65-67)...also devices must change from one frequency to another (column 10 line 5-8).

With regard to claim 111, in in combination Souissi et al. Mattisson and Kostick et al. teaches the method recited in claim 104. *wherein each of the bands has a*

frequency range of at least 400 MHz. Souissi et al. discloses the network may employ packet switching, wherin the time slots are defined by the frequency hopping intervals (in Bluetooth, 1600 hops per second in through an arbitrary order of sequential 1 Mhz channels 2.402 and 2.480 GHz, column 134 line 55-60). It is inferred that the frequency channels can be increased to allow transmission of more data. It is inferred the frequency sequence can range from 400 MHz.

Souissi et al. teaches the claimed invention except for the 400 MHz. It would have been obvious to one having ordinary skill in the art at the time the invention was made set the minimum frequency range since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

With regard to claim 112, in combination Souissi et al. Mattisson and Kostick et al. teaches the method recited in claim 104. *wherein communicating is performed using a wireless communicating medium.* Souissi et al. discloses having piconets 19, 20, and 21... also any of the communication devices can be become an access point or node through which devices communicate (column 3 line 56-67).

With regard to claim 113, in combination Souissi et al. Mattisson and Kostick et al. teaches the method recited in claim 104. *further comprising adding another device to the piconet, wherein adding the another device comprises assigning the code to the another device.* Souissi et al. discloses a given network ("piconet") can have one AP (access point) 48 or can have more than one , which are capable of joining or

maintaining different piconets, which have different frequency hopping sequence ("unique code", column 17 line 65-67 and column 18 line 1-14). It is inferred that the network ("piconet") joining another piconet will have the own unique frequency hopping sequence.

17. **Claim 108** is rejected under 35 U.S.C. 103(a) as being unpatentable over Souissi et al. (US Patent 6,920,171) and Mattisson (US Patent 6,246,713) and Kostick et al. (US Patent 6,549,784) as applied to claim 104 above, and further in view of Watanabe et al. (EP 220466 A1).

With regard to claim 108, in combination Souissi et al. Mattisson and Kostick et al. teaches the method recited in claim 104. *further comprising changing a state of a band for at least one of the dwell times from a first state to a second state, wherein: the first state is a designated state or an undesignated state; and the second state is the other of the designated state or the undesignated state.* Souissi et al. discloses having piconets 19,20, and 21 utilizing frequency jumps with time-slot-and-frequency combinations ("bands" column 4 line 59-65). Watanabe et al. discloses having a wireless communication of a spread spectrum communication system 11 that performs frequency hopping using a plurality of frequency channels having different frequencies and defined in a usable frequency band (Abstract). Watanabeet al. further discloses have a channel select process whereby is determined which communication channel is excluded from the frequency hopping sequence (column 7 paragraph 28 line 1-14).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a frequency jumps as taught by Souissi et al. excluding communication channels from the frequency hopping sequence as taught by Watanabeet al. to avoid channels that are not degraded by interference.

Prior Art

The prior art made of record and not relie4d upon is considered pertinent to applicant's disclosure.

Chang et al. (PG PUB 2005/0286467) discloses having a dynamic channel assignment.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DeWanda Samuel whose telephone number is (571) 270-1213. The examiner can normally be reached on Monday- Thursday 8:30-5:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Q. Ngo can be reached on (571) 272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Dewanda Samuel
1/27/2008

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